



Master's Degree Thesis

Main Success Factors for Developing Car-sharing in China

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Abstract:

Car sharing is an innovative strategy for the management of transportation demands, which can offer its members the convenience and flexibility of vehicle ownership at a lower cost. It also has environmental and social benefits. In China, ‘car-sharing’ refers to a more convenient way of renting a car.

The aim of this thesis is to investigate the main factors for successfully developing a car-sharing service in China. It begins with a review of existing literature related to car-sharing and sustainability. This enabled a summary to be made of the success factors of the Zipcar Company and an analysis of the developing environment of the Chinese market.

Next, we contacted a car-sharing company in China and successfully interviewed the CEO to obtain more practical information about the current situation of the development of car-sharing. We also interviewed several professionals who work in the field of transportation law and insurance to obtain some specific answers. Meanwhile, we conducted a survey between March 8 and April 25, 2014, receiving 104 responses from users and people who have not yet used a car-sharing service.

Finally, according to the interview and the survey, there are two main factors that hinder the development of car-sharing, namely the lack of sufficient support from the government and the inadequate dissemination of related information. We then created a ‘to do’ list for local government to suggest some ways to promote the development of a car-sharing service in China.

Keywords: Car-sharing, Chinese Market, Sustainability, Product-Services System.

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We would also like to thank the teacher, Qingzhi Lin, who works in the field of transportation law and regulations at the SSPU (Shanghai Second Polytechnic University) in Shanghai. She provided us with a lot of specific car-sharing or car rental documents.

Finally, huge thanks to each of our families for all their support and thank you to all our classmates and friends.

Statement of Contribution

This thesis was a collaborative effort by Lujun Gu and Hai An. The topic of car-sharing was initially conceived by Hai An based on his interest in the field of the sustainable development of the automobile industry, his background in automobile design, and his enthusiasm for how to reduce the pollution automobiles bring to our society. The interest in car-sharing was also shared by Lujun Gu, who was invited to join the thesis team. While each author took the lead in different parts of this thesis, all the elements were jointly done and were a joint creation. Both members put their best efforts into contributing their abilities and personal skills to the various components and stages of the thesis. Several especial tasks were distributed as follows:

The research design, which related to the development of goals, conceptualization, and the overall development of questions were shared by both members. The survey was distributed by Hai An.

Both members shared the responsibility for writing reports, but Lujun Gu was responsible for the final editing.

In terms of other duties, Lujun Gu was the overall project manager and main contact person for the supervisor.

Common interests made the process a learning-filled, interactive process throughout much of the thesis. Each of us learned a lot from the other and we are each thankful to the other for those teachings.

Karlskrona, Sweden, 2014

Lujun Gu, Hai An

Executive Summary

1. Introduction

Car-sharing (known as car clubs in the UK) is a model of car rental where people rent cars for short periods of time, often by the hour. They are attractive for customers who only need to use vehicles occasionally, as well as those who would like occasional access to a different type of vehicle than the one they use on a daily basis (Shaheen, Sperling and Wagner, 1998). A car-sharing service is a new model positioned between a privately-owned car and public transportation. It originated in Switzerland and Germany. It can control the flow of traffic, reduce the air pollution, and improve traffic efficiency. Car-sharing is currently rapidly increasing in the United States, Canada, Japan, and other countries. A car-sharing service aims to adjust existing traffic behavior, improve traffic efficiency users needs, and reduce the negative environmental impact of traffic.

However, the car-sharing market in China has shown no sign of rising since the concept was first introduced in 2010. With the ever deteriorating congestion and pollution problems in China, there are obvious benefits to increasing the usage of this service.

2. Research Questions

For a new business model (e.g. car-sharing) to be successful in a foreign environment, it is essential to examine the local laws, culture, and customers to determine whether the goods or services comply with the

local demand. Since there is still relatively little interest for car-sharing in China, it is necessary to conduct a feasibility study to reveal the current issues and propose some potential ways to expand this market.

The purpose of this thesis is to recommend a feasible car-sharing model for China. Firstly, there is a need to examine the current situation of car-sharing in China, and the reasons for the slow growth of the car-sharing market by asking the following two research questions;

- 1. Which factors influence the Chinese car-sharing market the most?*
- 2. How can car-sharing be supported in the Chinese market?*

3. Methods

Firstly, a literature review was conducted to understand how the car-sharing service has evolved since it was first introduced, the latest global trends in car-sharing, and the current development of car-sharing in China. A case study of the business operation of Zipcar was undertaken to reveal the reasons for the company's success. These background studies enabled us to summarize the four main factors that were affecting the growth of car-sharing in China, namely, policy, economy, social, and technology.

Secondly, we interviewed the CEO of a private car-pooling company and several experts from car-related industries to acquire some direct feedback on specific questions tailored to reveal the main issues involved in car-sharing in China.

Finally a questionnaire was distributed in Shanghai to obtain some general information about the current car-sharing situation, including popularity, expectation of car-sharing, and so on. A sample size of 104 people, mainly consisting of young working class people between the ages of 19 and 30 was targeted in the survey. Since most of these young people have not yet saved sufficient money to afford a car, they represent the potential users of a car-sharing service in China.

4. Results

According to the literature review, car-sharing is at the conceptual stage in China; therefore, China is ripe for developing a car-sharing service. According to the interview and survey, car-sharing lacks support from the government and information has been insufficiently disseminated to the general public. These are two main factors that hinder the development of car-sharing in the Chinese market. After a detailed discussion, we are able to give several guidelines to local government, as follows:

- The government should become involved in realizing the car-sharing concept by actively promoting the benefits of car-sharing and working with insurance companies and service providers to create a secure renting scheme with tailored transportation laws and car insurance packages.
- Depending on the local demand, service providers can develop diversified forms of car-sharing (i.e. station-based car-sharing, peer-to-peer, and car-pooling, etc.).
- The local government can facilitate the operation of reputable service

providers by giving financial aid and building infrastructure exclusively for car-sharers.

Glossary of terms

B2C car-sharing: Business-to-Consumer car-sharing is a rental scheme in which a vehicle is loaned to customers by the minute, hour, or kilometer (Lewis. & Simmon, 2012).

P2P car-sharing: (known as peer-to-peer car rental) is a scheme whereby existing car owners make their vehicles available for others to rent for short periods of time through an online platform managed by service providers.

Car-pooling: (also car-sharing, ride-sharing, lift-sharing and co-voiturage) is the sharing of car journeys so that more than one person travels in a car.

Greenhouse gas: (sometimes abbreviated to GHG) is a gas in the earth's atmosphere, consisting of water vapor, carbon dioxide, methane, nitrous oxide and ozone. The gas absorbs and emits radiation within the thermal infrared range, making the surface temperature approximately 33°C warmer. (Karl & Trenberth, 2003).

The Organization for Economic Co-operation and Development (OECD): OECD is an international organization of 34 countries founded in 1961 to stimulate economic progress and world trade with transparent policies, continuous dialogue, and fair trade practices. (OCED department office website, 2013).

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1. Introduction

Traffic issues in China have currently become more and more serious with the volume of vehicles, lack of parking spaces, and the use of cars causing air pollution in many big Chinese cities (Zhang, Ying, and Wang, 2009). Since China is a highly populated country, the distribution of resources is limited. The control of license tag has become more and more strict, and the cost of buying and owning a car is rising higher and higher. Parking space is saturated in urban areas. For example, Shanghai covers 6340.5 square kilometers (km²), which accounts for just 0.0646% of China, but it has a population of more than 23.8 million. With the exception of the Pudong district, the population is more than 17000 people per square kilometer in nine districts (The Census Bureau in Shanghai, 2012). Hence, automobile consumption is a major problem in China.

The obvious benefit of car-sharing is the reduction in the number of vehicles on the road at any given time. . According to a Swiss research, every car-sharing user can reduce 290 kg of carbon dioxide a year, which means that a "car-sharing" plan for Werder Bremen reduces 1600 tons of carbon dioxide emissions a year (China Byte Journal Publishing House, 2014).

According to the newly completed 2011 annual report of Shanghai comprehensive transportation, 2.487 million vehicles were registered in the city at the end of 2010, including car ownership of 1.707 million vehicles, up by 13.6% from a year earlier, while the number of private cars broke the million mark, 1.01 million cars, a year-on-year growth of 19%. According

to China's domestic research consultancy forecast, car-sharing would reduce the distance traveled by car from 7044km to 4073km each year, about 58% less than before. After the implementation of car-sharing, car travel would be reduced by 33% - 50%. In Shanghai, after joining a car-sharing organization, private car travel would be reduced by 37% a year, from 15907 km to 10095 km. Research shows that car-sharing greatly reduces the original number of auto car miles, but no cars increase their original mileage; however, since this is only a small part of the number, all the numbers of the overall average car mileage would be reduced by 42% - 50% (Chen, 2012).

Car-sharing is an innovative transportation demand management strategy, which can offer its members the convenience and flexibility of vehicle ownership at a lower cost. It also has environmental and social benefits (Shaheen. & Martin, 2006). In China, 'car-sharing' actually refers to a more convenient way of renting a car. People only need pay for the time or the distance they drive. This kind of service not only provides convenience for travelers, but also promises to relieve the pressure of urban traffic. On the one hand, it reduces the number of privately-owned cars; on the other hand, it saves a lot of parking spaces for the city, since one shared car can replace 8 private cars (Eastday China, 2010).

Many big cities in Europe and America can be seen to have developed car-sharing services to resolve the 'city traffic' congestion problem, which is a good inspiration for us. With the rapid development of the economy of China, innumerable families have been able to afford a car, but the resulting congestion and exhaust emission pollution have become real problems for urban development. On the one hand, car-sharing services have rapidly

developed in major cities in Europe and the United States, leading to the ease of congestion and air pollution. If this success can be replicated in major Chinese cities, such as Shanghai, it could serve as a model for other cities in China to follow. Therefore, the aim of this thesis is to create a car-sharing scheme to target the Chinese market by conducting an empirical analysis of consumers' opinion of this concept.

We will begin our investigation by introducing the methodology adopted to complete the research, as well as with a literature review on the evolution of the car-sharing concept. Subsequently, the results will be presented, followed by a proposal of a car-sharing framework tailored for the Chinese market. Finally, the implications of our findings will be discussed in detail and the thesis will be concluded with the limitations and some suggestions for future work in this field. The purpose of this thesis is to encourage the development of a car-sharing concept in China.

1.1 Research Questions

The development of car-sharing in China has aroused our curiosity about the factors that can successfully foster car-sharing in the Chinese market. We articulate our role in this process in the following two research questions;

- 1. Which factors influence the Chinese car-sharing market the most?*
- 2. How can car-sharing be supported in the Chinese market?*

It can be determined from this that our long-term goal is focused on the development of Chinese car-sharing. Firstly, we want to understand the factors that currently influence the Chinese car-sharing market the most, and then we will create a set of guidelines and scenarios to promote the development of a Chinese car-sharing service based on our analysis.

2. Research Context

In this section, we discuss the theoretical basis behind our research approach: Product-Service Systems and sustainability. We explain what a (PSS) Product-Service system is, the main categories of PSS in the automobile industry, the potential benefits of a PSS approach, and the development of a PSS. In addition, the concept of sustainability and its importance to modern business operations are described in this section.

2.1. Product -Service System

A Product-Service System (PSS) is a concept that incorporates both products and services into a single package as a way to enhance the value of the product, satisfy customers' needs, and lower the environmental impact as opposed to the traditional focus on the product only. (ELIMA, 2005). The main objective of a PSS is to create more revenue through the life-cycle of a product, while achieving sustainability, such as reducing the impact on the environment.

Goedkoop et al. (1999) add further clarification by also defining the key elements of a PSS, as follows;

1. **Product:** a tangible commodity manufactured to be sold. It is capable of 'falling on your toes' and fulfilling users' needs.
2. **Service:** an activity (work) done for others with an economic value and often done on a commercial basis.

3. **System:** a collection of elements including their relationship.

2.2. Types of PSS

The concept of a PSS is fundamental to make current business models more sustainable. However, different types of PSS have different key elements; therefore, it is important to define which type of PSS is suitable to develop the business. Behrendt et al. (2003) propose the following classifications of various types of PSS;

(i) *Product-oriented services*, where the business model is still largely associated with the sale of products to consumers, with some additional services;

(ii) *Use-oriented services*, where products remain central, but are owned by service providers and made available to users in different forms;

(iii) *Result-oriented services*, where customers and service providers agree on a desired outcome without specifying the product involved.

Different types of PSS have different value characteristics and car-sharing is a use-oriented service according to Skinner et al. (2004), who provide a comprehensive overview of the burgeoning number of car-sharing schemes across the globe. The majority of schemes fall within one of four main categories: public-private partnerships, co-operative, not-for-profit, and commercial.

Van Halen (1999) states that the concept of PSS both enables governments to formulate policy related to sustainable production and consumption

patterns, and companies to discover directions for business growth, innovation, diversification, and renewal. The focus of our research is the Chinese car-sharing market, which includes researching the main influential factors and determining how car-sharing in the Chinese market can be supported. It is hoped that our research can contribute to the future development of car-sharing in China.

2.3. Sustainability

The concept of sustainability has now become a crucial mandate for a business operation. While initially coined by the Brundtland Commission with respect to the preservation of the natural environment, the term has now evolved to encompass broader aspects of business operations and processes. These include the ability of a business to respond to its environmental, economic, and social responsibility in a way that not only meets the current demands of society, but also those of future generations. In a simple sense, sustainability refers to the capability of maintaining a successful business in the foreseeable future (Carroll & Buchholtz, 2014).

With the growing concern for the limited natural resources and high environmental impact, businesses need to rethink their growth strategies by adjusting their practices of product development, pricing, distribution, and branding (Kotler, 2011). Food retailers were the earliest initiators in embracing the concept of sustainability by establishing an accountability system to meet their consumers' demands. Evidence has shown that improved accountability can benefit a business in the long run (Iles, 2007).

3. Research Methods

- 1. Which factors influence the Chinese car-sharing market the most?*
- 2. How can car-sharing be supported in the Chinese market?*

In order to answer the above research questions, we need some practical data to analyze the current car-sharing situation. Hence, we choose interviews and a survey as efficient ways to acquire this practical data.

3.1. Interview

3.1.1. Interview with the CEO of a Chinese car-sharing company

Brief introduction of the respondent:

Simon Wang is the CEO of a car-pooling company called 'Kuai Pin Che' which translates as 'Fast Car-pooling', which he founded in Shanghai in September 2013. This is a service that is emerging in many big Chinese cities. In the first month, there were more than 10 thousand members and today there are more than 200 thousand, which makes Simon believe that there is great potential for a car-sharing market in China. He was interested in our thesis topic and was willing to share information about his car-pooling company because he also hopes that we can provide him with some foreign car-pooling or car-sharing information. In fact, this company creates a platform for customers to quickly match each other's needs to minimize the use of private cars. People can use phone apps to

search for empty seats on their way to work or anywhere else. However, the company is currently facing some problems of illegal operation or safety issues. Simon told us that car-pooling or car-sharing is not well developed and he hopes that we can help him to find out why. Meanwhile, he provided us with a great deal of information about his company and the current Chinese car-sharing situation.

What we wanted to know from him:

Question 1: What are the main factors that hinder the development of Chinese car-sharing from the company development perspective?

Question 2: Is the development pattern of Chinese car-sharing companies the same as foreign companies or it has Chinese characteristics?

3.1.2. Interview with an expert of transportation law and regulations

We interviewed our teacher (Qingzhi Ling) who teaches transportation laws and insurance at the SSPU (Shanghai Second Polytechnic University), and she gave us a great deal of information about car-sharing or car renting. However, she could not give us a detailed answer to the second question, but luckily, she was able to recommend Mr. Ma, who works for a car insurance company and could tell us more about car insurance.

What we wanted to know:

Question 1: Are there are transportation laws tailored for car-sharing in China?

Question 2: Is there any specific insurance for people who use a car-sharing service?

3.1.3. Interview with a consultant on transportation insurance

We interviewed Mr Ma, who is an insurance consultant working for the Ping Insurance Co., by telephone because **we wanted to know**:

Question: Is there any specific insurance for people who use a car-sharing service?

3.1.4. Interview with a professor of automobile industry development in China

We interviewed Professor Zhang, who is an expert in the field of automobile industry development in China in order to discuss the following:

Question: Can you suggest any way to promote the development of a car-sharing service in China?

3.2. Survey

We also undertook a survey to collect data about car-sharing users and non-users to try to determine the factors that hinder the development of car-sharing in the Chinese market. At the beginning of the survey, we made it clear that this survey is focused on people who live in Shanghai. We chose Shanghai as the representative city mainly because the ‘car-sharing’ concept was officially proposed for the first time in China at the 2010 World Expo in Shanghai by the Mayor of Bremen (Cridland, 2010). Also since the population density is very high and the traffic congestion is

extremely serious, Shanghai is considered to be a good market for applying a car-sharing service.

We distributed the questionnaire via the Internet, and allowed one month to collect the data from March 1st to April 1st. We chose a free website called ‘WEN JUAN¹’ as the platform to distribute the survey and collect the responses. We mainly used our own social media to promote and spread the survey and after the respondents had finished it, we recommended that they spread it around so that more people could complete it. The survey was developed in the Chinese language, but it is translate it into English for the purposes of this report.

We mainly wanted to collect general information about our respondents’ views on car-sharing, so we designed our survey with the following structure: at the beginning, we provided a short introduction to car-sharing to ensure that everyone had brief knowledge about car-sharing services before completing the survey. Then, in the first section, we asked them to provide details of their age, education, profession, driving license, private car ownership, knowledge of car-sharing concept, and so on. In the second section, we divided the respondents into two groups: car-sharing users and non-car-sharing users. We designed some tailored questions for each of the group to help us to understand the customer base.

¹ ¹ WEN JUAN: Currently the largest free online survey platform in China. The platform can provide corporate and personal questionnaire including create, publish, manage, collection and analysis services. <http://www.wenjuan.com/>

4. State-of-The-Art

4.1. Literature Review

We reviewed existing literature about car-sharing and sustainability from both Chinese and English sources. The key points, which gave us some insights into the features of car-sharing, are summarized below.

Sharing economy

The concept of sharing economy, also known as "collaborative consumption", has existed for ages in our society. It is based on an economic model where people swap, barter, trade, rent or share resources or goods and services. Without a doubt, the "use rather than own" concept will lead to a reduced consumption of resources, particularly with products that are material-intensive in the manufacturing and packaging phases (Leismann, Schmitt, Rohn, and Baedeker, 2013). This old market practice has seen a rapid increase in popularity and become more diversified than ever before with the recent economic recession, environmental concerns, technological innovation, and the arrival of a cyber social network (Botsman & Roo, 2010). The dissemination of this concept requires the entrenchment of a consultancy infrastructure that not only provides the facts and data behind the resource consumption, but is also an experimental ground on which the transaction can be carried out (i.e. neighborhood-based re-use centers, start-up consultancy, etc.). In addition, the government can provide incentive schemes, such as tax benefits,

start-up funding, legalization of contracts and the clarification of insurance-related issues to stimulate the development of this concept (Leismann, Schmitt, Rohn, and Baedeker, 2013) Popular examples of collaborative consumption include (example companies in brackets): space sharing (AirBnB and CouchSurfing), co-working (the Hub), household item rentals (Zilok), ride-sharing (Zimride), peer funding and banking (Kickstarter), redistribution markets (eBay), and of course, car-sharing (Sunfleet and Flexidrive in Sweden, Zipcar and Getaround in the US) (Lewis. & Simmons, 2012).

Each of these companies provides a platform that facilitates (to different degrees and in different ways) the exchange. This can include such elements as the stipulation and administration of legal and insurance contracts and handling the exchange of monies, thereby freeing individuals from these time-consuming, complex, and sometimes socially-awkward tasks. These informal activities have been professionalized and standardized so that economizing individuals are naturally drawn to take part. This has resulted in the emergence of what has been termed the micro-entrepreneurship economy (Wong, 2012). People are able to establish their own sources of income through online platforms, thereby increasing their income and making it more resilient (Lewis & Simmons, 2012).

Since a car-sharing service as a newcomer based on sharing trends, it will enjoy the benefit of a sharing economy and attract more people to join this new industry.

4.2. Benchmarking Car-Sharing Companies

As already mentioned, there are several car-sharing business models in the world. These are presented below based on a report from ‘Sharing the future – Perspective of the Chinese car-sharing market’ (Berger, 2014).

Car-sharing fleet models

Station-based car-sharing

- Vehicles are located at stations covering a specific area
- Vehicles should be returned to the same pick-up station
- Standardized fees and usage time calculated in one-hour intervals or kms driven
- Mainly replacing traditional car rental

Private P2P car-sharing

- Private vehicles rented out by their owners
- Located at the owner’s home and returned to the same place
- Cars covered by special insurance for the rental duration
- Fees specified by car owners

Free-floating car-sharing

- Vehicles are spread out across the city
- No specific pick-up and return points - picked up and returned anywhere within a prescribed area
- Standardized fees and usage times calculated in minute intervals

Main characteristics of various fleet models

Table 1: Difference between fleet models in terms of vehicle ownership, maintenance, vehicle position and driving mode

	Station-based	Private P2P	Free-floating
Main feature	Renting vehicles from specific pick-up points or areas	Renting private individuals' own vehicles	Renting vehicles that are spread out across the city
Vehicle position	Provider's station or public parking within area of operation	Owner's parking space or public parking near owner	Public parking within entire operation area
Vehicle ownership	Provider	Renter	Provider
Maintenance responsibility	Provider	Renter	Provider
Refueling	Customer	Customer	Customer

responsibility			
Washing responsibility	Provider	Customer	Provider
Possible trip types	Mainly round trips	Mainly round trips	One-way and round trips

Besides "traditional" car-sharing schemes, other business models cater for specific customers' needs or scope of application.

Innovative car-sharing business models

Fractional ownership

- Customers buy or sign up for a fractional ownership of a car-sharing fleet ("time-share")
- Customers typically then have access to the entire fleet
- Focus on luxury and expensive cars, high-end service and low member-to-vehicle ratio
- Main benefits: Access to multiple high-end cars without having to buy and maintain them

Hosted car-sharing

- Upon successful application, hosts receive a vehicle "free-of-charge" from the car-sharing provider
- They are responsible for parking it in a public space as well as maintaining and refueling it
- Enhanced sense of car ownership for customers

- Operational cost savings for providers

E-vehicle car-sharing

- Typical station-based car-sharing fleet model
- Only electric (micro) vehicles or hybrid vehicles are selected
- Power stations and reloading services included in service offering
- Main benefit: Environmental-friendly transportation

4.3. Global car-sharing Trends

Unlike expansions to mass transport systems, which are typically spearheaded by governments, the growth of car-sharing was initially driven by private organizations like Zipcar, Greenwheels, and Car2Go. Contemporary car-sharing was born in Switzerland and Germany in the 1980s, introduced to North America and Asia in the 1990s, and steadily gained global popularity during the first decade of the 21st century. In 2009, the number of cities with car-sharing systems topped 1,000. As of October 2012, 1.79 million customers were sharing almost 43,550 vehicles in car-sharing systems across 27 countries and five continents, signaling that the rate of growth for this relatively young industry is increasing rapidly (Zheng, 2013). (Figure 1)

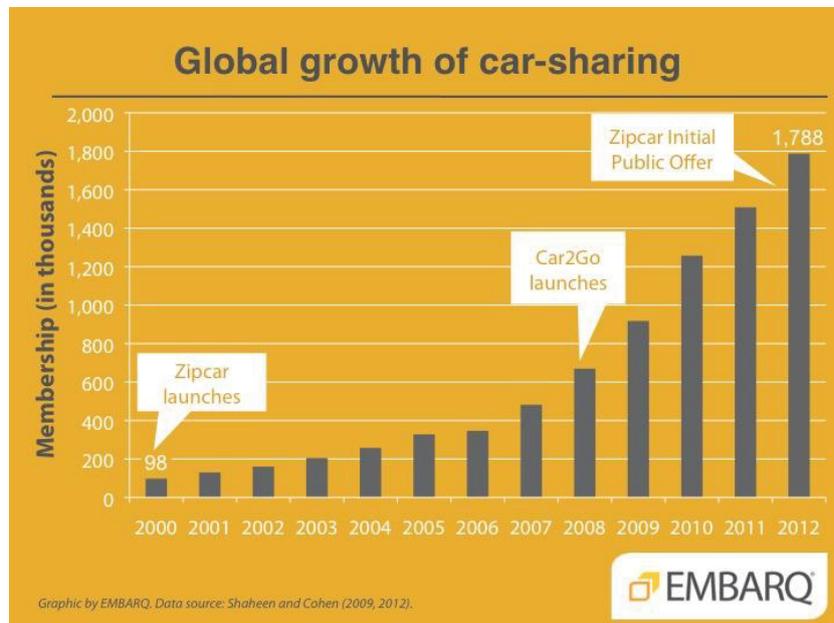


Figure 1: Global growth of car-sharing. (Graphic by EMBARQ)

Although North America and Europe currently account for about 90% of car-sharing memberships and fleets, car-sharing has quietly taken hold in several cities located in emerging economies, including São Paulo, Brazil (joined in 2009); Beijing, China (2009); Hangzhou, China (2011); Istanbul, Turkey (2011); Mexico City (2012); and Bangalore, India (2013), among others. Car-sharing operators in emerging economies are generally quite small – EMBARQ² research found the largest had just 60 cars as recently as August 2012 – but some are growing quickly, particularly in Mexico and China. For example, Hangzhou’s EVnet increased its number of stations

² EMBARQ is the World Resources Institute (WRI) signature initiative for sustainable transport and urban development, operating through a global network of centers in Brazil, China, India, Mexico, and Turkey.

from 13 to more than 50, and membership from 1,300 to 4,000 in a single year (Zheng, 2013). (Figure 2)

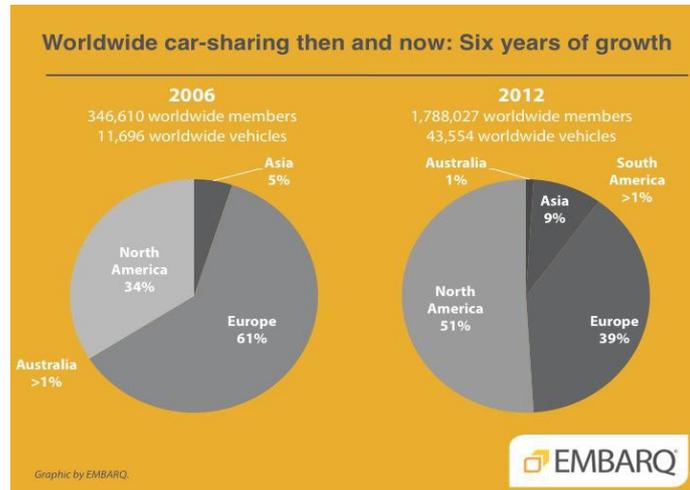


Figure 2: Worldwide car-sharing then and now: Six years of growth (2006-2012) (Shaheen & Cohen, 2013).

4.4. Development of Car-sharing in China

The concept of ‘car-sharing’ was first proposed at the 2010 World Expo in Shanghai by the Mayor of Bremen, Germany, where they already had a very good car-sharing system. (Cridland, 2010).

In Shanghai, the first test of the car-sharing project was held in July 2010. The government set two service points in the Pudong and Puxi areas. In the first month, more than 400 people were involved, giving positive feedback (Shanghai Government, 2010).

According to our study, two types of companies offer a car-sharing service in China. One is called ‘Rent by Hour’ which is a traditional car rental company that has transformed itself into a car-sharing company. The other is called ‘Car-Pooling’, which uses the same function to minimize the use of cars. Both of these companies are running smoothly and trying to reduce their prices to attract more people to become involved.

In May 2012, the government of Hangzhou³ began to generalize the car-sharing project. This time they chose another way. Normally car-sharing refers to a peer-to-peer (P2P) service, but this time, they used a business-to-customer (B2C) model to fit the conditions in China, and this has been a huge success. The company runs a car-sharing service system by introducing a new concept of ‘rent a car by the hour’, which attracts the interest of many office workers. Members need to provide information about their driving license and credit card and then they are given an ID card, which is very similar to the Zipcar model. Members can check themselves in and out using this online booking and ID card system, and the final price will be calculated by the booking management system and a message will be sent to the customer. The only problem is the price, which is higher than that of a normal car rental company if the car is rented for the whole day, but it is still very popular and all the cars are always fully booked (Fang, 2013).

The city of Hangzhou was again in the spotlight when it announced an ambitious car-sharing project of up to 100,000 electric cars. This could potentially become the world’s biggest EV car-sharing system. According

³ Hangzhou-the capital and largest city of Zhejiang Province in Eastern China also the fourth-largest metropolitan area nationally

to the plan, residents of the greater Hangzhou region could access up to 100,000 self-serving EV rentals and related supporting infrastructure within five years from now. Kandi Technologies, the producers of these EV cars, have expressed that they are keen to make this city project a model that could spread to other parts of China:

‘Pure EV sharing for public transportation, it has been very well received by many cities in China. Shanghai, Chengdu, Jiangsu, and Hainan are actively pursuing to adapt to this new mini-transportation model in their areas. It is very likely that, in coming year, these cities will begin the building of pure EV smart parking and charging facilities. Kandi plans to expand into these new markets when the local supporting infrastructures are ready.’ (EarthTechling, 2013)

According to the report by EarthTechling, this project has been well received by consumers, as well as gaining strong support from the local government. Many officials strongly believe that the program will revolutionize urban transportation, making traveling a great deal more convenient.

4.5. Study of Zipcar’s Operation

Since the Zipcar Company is successful in car-sharing, the idea is to analyze the success factors of Zipcar to be able to learn what works.

Zipcar is a car-sharing company based in Massachusetts, USA. It offers its

members the flexibility of using the car by the hour or the day. Founded in 2000 by Antje Danielson and Robin Chase, Zipcar quickly expanded its operation to nationwide coverage after merging with Seattle-based rival, Flexcar, in 2007. As of July 2013, the company had more than 810,000 registered members, with a fleet size close to 10,000 vehicles throughout the US, Canada, UK, Spain, and Austria (Press release, 2013).

Zipcar offers its members the flexibility to book either online or by phone immediately or up to a year in advance. They can simply walk up and unlock the car door using an access card, and drive away with a pre-located key inside the car. A smartphone application can be downloaded, which helps users to locate the parked car by activating its horn.

A one-time fee is charged upon initial membership application, as well as an annual fee and a reservation charge. The reservation price includes petrol, parking, insurance, and maintenance.

4.5.1. Success points of Zipcar:

1. Understanding the customer base

Chase and Danielson researched the way of life and work of urban residents, as well as their main means of transportation. They visited a great many potential customers to determine the situation and the problems when they rent a car in order to understand their needs. The company studied the customers' commonalities, thoughts and most important factors, and then tailored services for them. The Zipcar Company has attracted a huge customer base so far, made up as follows;

- City residents or students who occasionally need to use a car for several hours
- University administrators who want to build a car-sharing service for college students
- Landlords who may provide a car-sharing service for tenants
- Companies that want to use a car-sharing service as an employee benefit

Zipcar points out that, once you understand customers' thoughts, you will find that each market issue of the customer base is quite different. It examines the market issues through the eyes of customers, responding to their choice, rather than pushing the product in the market.

2. Quantitative Impact

In the beginning, Zipcar surveyed and obtained the basic information of the population of Boston, Vancouver, London, Chicago and other cities. They discovered that Americans spend 18% of their income on transportation and 25% of people use a mobile phone, which encouraged Zipcar to use the Internet and a mobile APP as a platform.

3. Investing in technology

It is always easier to buy technology than to make it, but Zipcar's chief executive, Scott Griffith, says that Zipcar chose the tough road because "nothing out there came close to what we wanted to deliver." The result is a unique system that uses radio frequency identification to lock and unlock

the cars, as well as wireless technology to monitor information such as number of miles driven, battery voltage, and fuel level (Marquardt, 2008).

4. Keeping it simple

This is a self-service business that requires no face-to-face interaction, so it has got to be hassle free. Customers pay a \$25 application fee to join and can choose between an hourly plan and a prepaid driving plan. Within a few days, a Zipcard (which serves as a car door key) arrives in the mail, along with a three-step instruction book explaining how to activate the card, reserve a car, and unlock it.

4.6. Factors that Affect the Growth of Car-sharing in China

We analyzed the current transportation policy, social environment, economic and technology in China, because we wanted to determine the positive or negative factors that affect the development of car-sharing in order to acquire a deeper understanding of car-sharing in China according to the country's current conditions.

4.6.1. Policy

From the perspective of the overall auto industry policy, the development of the Chinese automobile industry is actively encouraged and supported. The book entitled 'Automobile Industry Restructuring and Revitalization Plan' (Released in March, 2009) clearly states:

'The automotive industry is an important pillar industry of the

national economy which has the complex industry chain, wide range of employment and the increasing domestic demand. It plays an important role in the national economy and social development' (General Office of the State Council, 2009).

In the Planning Target, the No.2 planning clearly states:

'Establish a complete system of auto regulatory frameworks, reasonable car tax system, modern automotive service system and intelligent traffic management system.'

These policies can provide protection for the stable development of the automotive market. 'China Automobile Insurance and Claims Ordinance' clearly states that, when people lend their car to other people, they can only be awarded 85% after a traffic accident. The owner must bear the rest of the losses and costs. If a private car is used for an illegal operation, the insurance company will not compensate the losses and costs after a traffic accident (Zeng, 2010).

Car-sharing is still in the concept stage in China. There is no corresponding policy or regulation. As long as the exchange of money is involved, the 'Traffic Enforcement Department' can define it as an 'illegal taxi'. (In China, an 'illegal taxi' means the use of a private car to take passengers to earn money). This behavior is forbidden by the Chinese government, because it does not ensure the safety of the passengers, and it also affects the interests of regular taxis, which is the main reason that hinders the development of 'car-sharing', especially peer-to-peer car-sharing.

4.6.2. Economy

There has been a non-stop demand for car ownership in China with the strong economic growth in the past decade. According to the information from the Ministry of Public Security Traffic Management, by the end of 2013, the number of private cars owned in China was 85,070,000, which was 13 times than the number in 2003 and it is still growing at an average of more than 14,000,000 vehicles per year. By 2013, 29 cities had more than one million private cars and there were more than two million cars in Beijing, Shanghai, Hangzhou, Tianjin, Chengdu, Shenzhen, Guangzhou and Suzhou (The Central People's Government of the People's Republic of China, 2009). However, when searching the 'List of countries by vehicles per capita', it is evident that China has 83 motor vehicles per 1000 people, which is a huge gap compared with the United States, which has 797 motor vehicles per 1000 people.⁴ (The World Bank, 2011).

We also researched the 'city resident family per capita income and expenditure' to see if there is a good economic environment to encourage people to try the car-sharing experience. The money people are spending on transportation is increasing by up 3.8% every year.

4.6.3. Social Factors

When examining the development of car-sharing in America and Europe, it is easy to see that a car-sharing service is closely related to market demand and the density of the urban population. It is crucial to establish a stable customer base in order to cover the running cost of the cars and other

⁴ This article is a list of countries by the number of road motor vehicles per 1000 inhabitants. Please consider cars as different from road vehicles as the latter includes automobiles, SUVs, vans, buses, commercial vehicles and freight motor road vehicles. The present list excludes motorcycles and other two wheelers

operational expenses. The key to this lies in establishing service points in highly populated regions, each of which offers a different type of service to meet the local demand. For example, Shanghai covers 6340.5 square kilometers (sq.km.), which is just 0.0646% of the total area of China, but the population is more than 23.8 million, and apart from Pudong new district, the population is more than 17000 per square kilometers in nine districts (the Census Bureau in Shanghai, 2012) in Shanghai. All of this data satisfies the conditions for the development of car-sharing.

There are multiple challenges facing the car-sharing industry in China. Cultural preference toward car ownership may make car-sharing less appealing in China than in other countries. It may take time for CSOs to develop an operational scheme that suits Chinese cities, and for city leaders to create supportive policies such as on-street parking for shared vehicles. Some local governments have supported electric vehicle car-sharing programs, although most of them are generally unaware of car-sharing as a potential sustainable transport solution. The rise of car-sharing programs in China could be part of a strategy to make cities more sustainable and livable while minimizing car ownership (Zheng, 2014).

4.6.4. Technology

Car-sharing organizations usually widely use modern technology management platforms, including the following four systems:

1. Online booking and management system

An online reservation system is a very easy system to help members gain

access to the car-sharing organization's communication platform via the Internet or a smartphone app. With this system customers can quickly find the vehicle they need and complete the booking process.

2. Vehicle access system

Usually the intelligent card facilitates the vehicle access system. Members can obtain a unique ID card after joining the car-sharing plan. After the booking process is complete, the system will automatically transmit the scheduled time and the card information to a predetermined vehicle, and the user can open the door with the ID card and enter the shared vehicle.

3. In-car information management system

An in-car information management system is a very useful system to complete real-time vehicle information collection and transmit the information to the vehicle management center. This system helps to achieve some additional features, such as vehicle positioning, navigation, and so on. These additional features can currently be accomplished using GPS technology.

4. Billing system

The payment is calculated from the basic data, such as mileage, driving time and gas payment collected by the in-car information management system at every single use. By the connection to the account, the car-sharing company can achieve automatic bill payment, which allows members to pick up and hand over the car themselves. The car sharing company submits monthly invoices to its members to confirm the payment details (Qiu, 2009).

5. Results and Analysis

5.1. Results of Interview

Several individuals were selected for interviewing, in an attempt to reveal the current situation and issues in Chinese car-sharing market. Based on their responses, we also summarized, in the following section, the key issues that hinder the car-sharing development in China.

5.1.1. Answers from the interview with the CEO of a Chinese car sharing company

We conducted the interview through e-mail. The following are the key points according to our interview questions:

Question 1: What are the main reasons hindering the development of Chinese car sharing from the company development prospective?

Answer 1: The current challenge of my company is that low active members directly lead to a low success car-pooling or car-sharing rate. I think there are three main reasons that hinder the development of car sharing or car-pooling from my company's point of view.

1. Customers are worried about divergence and controversy when facing a car accident or auto-damage problem because at present there is no thorough program for these situations such as car-pooling or car sharing agreement and there is no specific insurance for

car-pooling or car sharing.

2. Credibility is very important in China. Most of Chinese customers like to follow the mainstream and trust authority. If your business is supported by government and has large loyal members, more and more people will join. The development of car-pooling or car sharing service is at the key stage, which needs more efficient support from government.
3. Many people lack sharing-awareness. This awareness needs the guide from both government and car sharing companies; meanwhile, this also needs long accumulation of time. In general, car sharing or car-pooling service is similar to previous online shopping which most people have this kind of demands, but at the beginning there is only a small group of people trying to use this service and most of people take a wait-and-see attitude. Over time, I believe that more and more people will catch up with the sharing trend.

Question 2: Is the development pattern of a Chinese car sharing market the same as the market in other countries or does it have Chinese characteristic?

Answer 2: At present, car-sharing service is still at the conceptual stage. In general, Chinese car sharing is a little different from the car sharing in Europe or US. The car sharing service in China is a little similar to car-pooling in Europe and US because many people think car is an expensive private thing and they do not want to share the car with other people. They are just willing to share seats with other people. Hence, there is a big difference between Chinese car sharing and car sharing in other

countries.

5.1.2. Answers from the interview with the expert of transportation laws and regulations

Question 1: Are there specific transportation tailored laws for car sharing in China.

Answer 1: At present, car sharing is still at the conceptual stage in China. The government has not issued tailored transportation laws and regulations for car-sharing services. In many big cities, such as Shanghai, and Beijing, some leaders at transportation department encourage the development of car sharing because they agree that car sharing can do contributions to reduce traffic congestion, city air pollution and private car ownership. I believe the government will issue relevant transportation laws and regulations to support the development of car sharing in the near future.

Question 2: Is there any specific insurance for people who use car-sharing service?

Answer 2: There is no specific insurance for people who use car-sharing service so far; I recommend a person who is an insurance consultant that working in Ping An Insurance Company⁵. He knows more details about automobile insurance.

5.1.3. Answer from the interview with the transportation laws consultant:

⁵ Ping an Insurance (Group) Company of China, Ltd. is a holding company whose subsidiaries mainly deal with insurance and financial services.

Question: Is there any specific insurance for people who use car-sharing service?

Answer: At first, I must tell you both that all insurance clauses are issued by the government of China. Insurance Companies are just the ones conveying them to customers. At present, the government and public have recognized the benefits that car sharing can bring to our society such as reduce traffic congestion, air pollution and so on, but there are on specific insurance clause for the users of car sharing. The process of issuing every insurance clause is very complicated. It takes time to assess and check.

5.1.4. Answer from the interview with the professor of automotive development in China:

Question: Are there any suggestions that can promote the development of car sharing service in China?

Answer: In general, the control on the automobile sector by the government is very strict. Car-sharing service as a new industry, it needs to be led by some authority department. People still not accept this concept well and in China, most people have a high dependence on the government. Because if the government can support an industry, people will think it's trustworthy. Hence, through my experience I think if car-sharing service is operated by the Public Transportation Company (which is controlled by the government), then people who use the car sharing service will think they have the sense of safety. In this way, more and more people will be attracted to use this service. Perhaps in the future users can use bus cards to enjoy car sharing, which is a good choice because they will think it is convenient.

5.2. Analysis of the Interviews

After the interviews, we reorganized and summarized several important factors that are useful to our research. Here are some key points that we found:

- **A trustful framework of security system needs to be developed urgently for car sharing service.**

Through talking with the CEO and the experts, we realized customers are worried about divergence and controversy when facing a car accident or auto-damage problem. We also noticed that government has not issued tailored transportation laws or insurances for car-sharing users. As the CEO mentioned ‘Credibility’, we come to a key point: People need more sense of security when involved in car sharing service. In other words, developing a successful car-sharing service requires developing a trustful security system first. The security system needs to contain insurance, rental contract and transportation regulations. To facilitate this, the support from several authorities is needed: transportation department, insurance company, government, etc. need to support this concept.

- **Chinese car sharing is different from car sharing in other countries.**

When we take into account of the culture difference, Chinese car sharing faces a unique challenge. Vehicle ownership is considered as an essential item to have in modern Chinese society, as one often associate the success

of a person with the kind of car they drive. According to the CEO, many people think car is an expensive private thing and they do not want to share the car with other people. They are just willing to share seats with other people. That's why this car-sharing offerings are similar to car-pooling in Europe and US. However, China has station-based car sharing and peer-to-peer car sharing as well. So we come up with this viewpoint: Global business models cannot be transferred directly to Chinese car sharing market. We need different forms of car sharing service in order to adapt to different market demands. Chinese car sharing includes car-pooling, which customers do not have the ownership of cars. Here we make a list of different forms of car sharing service to meet the different needs of different people:

Table 2: Different forms of car sharing service to meet the different needs of different people

<i>Types of car sharing</i>	<i>Operate by</i>	<i>Features</i>
Station-based car sharing	Normal car renting company	People can rent cars for hours
Peer-to-peer car sharing	Operated by global car sharing company or public agency	People who willing to share cars with other people
Car pooling company	Private company under government supervision	People who only want to share seats with other

		people
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5.3. Results of Survey

In this section, we first present the demographic results from our survey. Young working class people were specially targeted in our sampling, since a significant portion of this age group does not have ownership to a car. Through these demographic results, we get the basic and general information about the car-sharing situation in Shanghai.

5.3.1. General information and sampling (104 respondents)

Gender:

There are total 104 people responded to our survey. 56% are male and 43% are female which is approximately balanced.

Age:

Almost all the respondents are young people whose ages are around 19 to 30 years old. The share of this age group is up to 93% in our survey.

Education:

Respondents are very well educated. Over 91% of the respondents have bachelor degree or above.

Driving license and private cars ownership:

44 respondents have driving license and 11 respondents are under processing. In general, there are more than half respondents (total 55 people) owning driving license. But when we come to the car ownership, only 11 people have a private car. As follows we can see there is a big gap between owning driving license and owning private cars (Figure 3).

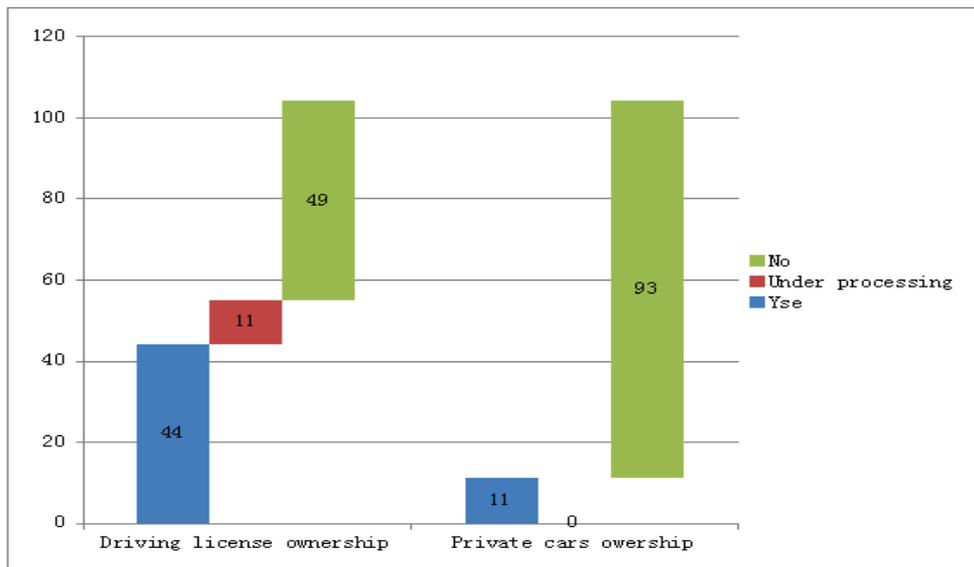


Figure 3: Driving license ownership about the respondents in the survey

Current awareness of car sharing service :

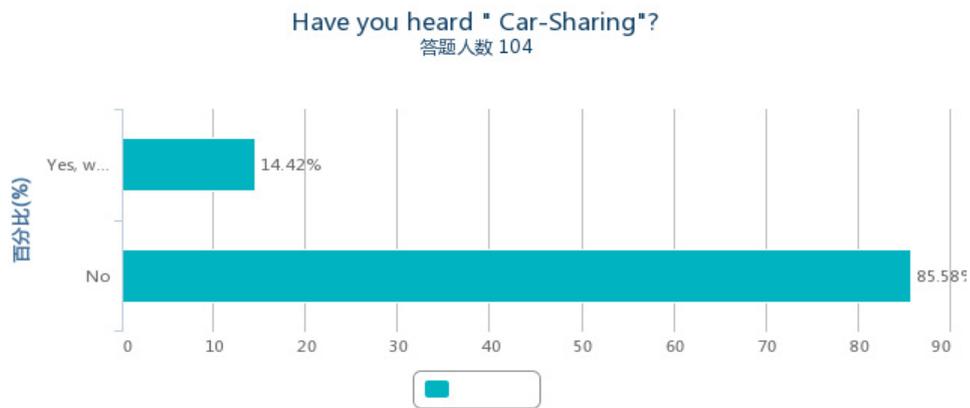


Figure 4: Current awareness of car sharing service

It is a big surprise that among the total of 104 people, 85.58% respondents (89 people) haven't heard of car sharing. The rest (15 people) who have heard about car sharing got the information mainly through TV news, websites or heard from friends.

Awareness is expected to increase

If you have heard of Car sharing, have you used this new service?

Table 3: Awareness is expected to increase

Answer	Number of respondents
<input type="radio"/> Yes	12

○ No	43
○ I never heard of it, but I am quite interested in it after your short description. I would love to have a try if there is car sharing service in my area.	49

When we asked: ‘If you have heard of Car sharing, have you used this new service?’ there are 12 people choosing ‘Yes’ and 43 people choosing ‘No’. 49 people choose ‘I never heard of it, but I am quite interested in it after your short description. I would love to have a try if there is car sharing service in my area.’ This positive attitude towards car sharing is an encouraging sign for the future development of car sharing in China. It would be possible to expand the current car sharing business with better marketing strategy.

5.3.2. Respondents analysis

Users’ report (12 people)

For the 12 car-sharing users (6 male and 6 female), all of them are young people (age from 19 to 30 years old) and have high education (bachelor or above).

They choose three main ways to book a car: phone apps, website or directly go to the car sharing station. Among these users, 9 people use car-sharing service only once a month and 3 people use 2-5 times per month. They

choose car sharing as a short-time transportation tool of traveling, shopping, business trip and commuting to work.

When we asked a short answer question: ‘During using this service, what are the things that you did not like?’ 4 of the users show their satisfaction of using the car-sharing service. By collecting the open answers from ‘What are the advantages of using car-sharing (short-answer question)’, most of them think that it is convenient and money saving when using car-sharing service. The rest mentioned ‘Payment’, ‘Complex procedures’, ‘Too few cars to choose’, ‘Sometimes the car is not very clean’, ‘Parking issues; we don’t have specific parking zone’, ‘Hard to identify how much petrol I used precisely’ as the problems.

Non-users’ outcomes (92 people)

When we asked: ‘Why you never use car sharing service’, 51 people showed that they never know about it. 25 people reflected that there is no car sharing service in their city. 6 people showed that they don’t like to share things with other people because they concerned about personal and property safety issues. Only 10 people thought that they do not need this service. In general, we can find that the dissemination of car sharing is not good again.

In the question: ‘If you would like to use Car sharing service, what are main reasons that you will consider’, most of them consider three main elements: price, service quality and the function of the cars.

We also put a short answer question: ‘What is your biggest expectation to Car sharing services?’ A lot of people drop their ideas. We’ve got 74

people’s answers. Because it’s all short answers in Chinese, we cannot translate them all and most of them are repeated. Here we summarize several key words that respondents mentioned most:

Table 4: A summary of the expectations to car sharing services

Safety	Price affordable	Convenience
More cars to choose	Good service	More stations/areas to pick up cars

5.3.3. Key findings from our survey:

- There is a big gap between owning driving license and owning private cars. 52.88% of respondents have driving license but 10.58% of respondents’ own private car.
- Car sharing service lacks a big dissemination. Only 14.42% of respondents have heard of car sharing. They mainly heard of car sharing through TV news, websites or heard from friends.
- 47.12% of the respondents show a big interest in trying the car sharing service after our short description of what is car sharing in the survey.
- Current car sharing users complain about ‘Payment’, ‘Complex procedures’, ‘Too few cars to choose’, ‘Sometimes the car is not very clean’, ‘Parking issues; we don’ have specific parking zone’, ‘Hard to identify how much petrol I used precisely’ as the problems when using car sharing service.

- Most non-user respondents expect car sharing to be safer, more cars to choose from, and more stations to pick up cars, lower price, good service, and more convenience. In other words, Price, convenience, safety, and service quality will be the main factors that they consider about car sharing.

6. Framework for Car-sharing in China

Having analyzed the current car-sharing situation in China, it became clear to us that there are still many obstacles to be overcome in order to realize the car-sharing concept in China. First, many car owners (P2P type) have concern about the huge liability that they could face if their renters damage their cars or get into an accident. Currently, there is no auto insurer in China offering coverage on this kind of lending scheme. Ultimately, the government needs to work together with both the insurance companies and the service providers to develop relevant laws, regulatory guidelines and tailored insurance products, so that all parties can feel reasonably protected against the possible liability.

On the other hand, it may be much easier to realize car-sharing with station based and free floating schemes, as the car fleets are entirely managed by either government or reputable companies. In cities with high population density, free floating schemes may work the best, as users can freely pick-up and return anywhere within a prescribed area. In more remote areas, station based systems are necessary as the customer base is much smaller or dispersed. In all cases, the local government should plan special parking areas or parking spots for the car-sharing users.

To create a feasible scheme for peer to peer sharing, special license can be issued, which requires the renter to be held responsible for regular inspection and keeping a good record of regular car maintenance. The renter should be required to sign a declaration that the car is well maintained and inspected for roadworthy prior to handing off the car to the

user every single time. The service platform provider will be responsible for overlooking the transaction and checking the credibility of users (i.e. past driving record).

The Chinese government currently uses subsidies mainly to support the development of electric vehicles. We think the government should also encourage the operation of reputable service providers by giving out start-up loan, funding, and tax reduction. Based on all the above considerations, we recommend the following framework for car sharing in China.

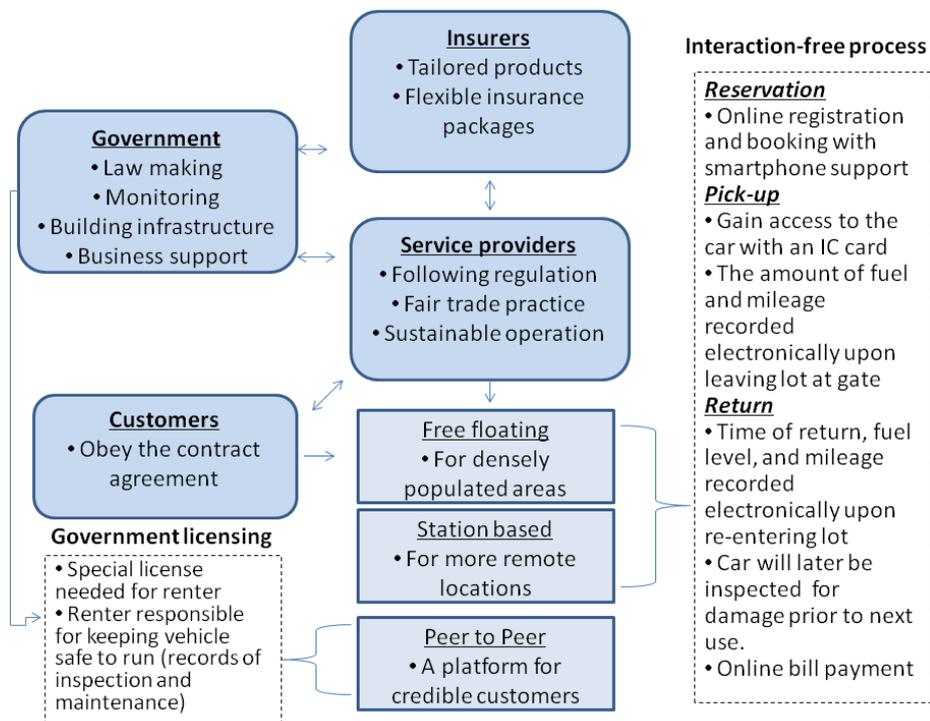


Figure 5: Framework for car sharing in China

7. Discussion

After analyzing the results from the interviews and the survey, we reorganize several key points and develop them into some themes that we can discuss about.

- **The respondents have a positive attitude towards car sharing, but low familiarity with the concept so far. It is possible to increase the awareness of car sharing by good introduction or dissemination.**

It is a fact in our survey that car-sharing service lacks a big dissemination and variety ways of advertisement but 47.12% of the respondents show a huge interest in trying the car sharing service after our short description of car sharing, which is a promising sign for car-sharing in China.

Reflected in the survey of the willingness of people to participate in car sharing, price, convenience, safety and service quality will be the main factors that they consider about car sharing. These are the key factors to pay attention to when developing and marketing car sharing.

The dissemination of car sharing is a very important factor. This requires the voice of the authorities and the mass media. We recommend promotion from the government, TV advertisements, Newspaper reports and Internet promotion.

- **A trustful framework of security system needs to be developed urgently for car sharing service. Regional and national governments need to be involved strongly.**

Through talking with the CEO and the experts, we realized customers are worried about liability and controversy when facing a car accident or auto-damage problem. We also noticed that government has not issued tailored transportation laws or insurances for car-sharing users. As the CEO mentioned ‘Credibility’, we realized that people actually need more sense of security when involved in car sharing service. In other words, developing car-sharing service requires developing a trustful security system first. This should include insurance, rental contracts and transportation regulations, which can provide or increase car sharing users’ sense of safety.

This needs the support from several authorities: transportation department, insurance companies, government, etc. To sum it up, strong governmental support is one of the key elements for driving Chinese car sharing market forward. One possible recommendation for the government is to develop a trustful security system for car sharing service first.

- **China can develop diversified forms of car sharing to meet the needs of different market demands. Chinese car sharing will be different from foreign car sharing.**

When we consider the culture difference, Chinese car sharing faces a big challenge. Vehicle ownership is a status symbol for most private consumers in China. As the CEO mentioned that many people think car is an expensive private thing and they do not want to share the car with other people. They are just willing to share seats with other people. That is why this car-sharing company is a little similar to car-pooling in Europe and US. However, we do have station-based car sharing, peer-to-peer car sharing as well. So we come up with this viewpoint: Global business

models cannot be transferred directly to Chinese car sharing market. We need different forms of car sharing service in order to adapt to different market demands. Chinese car sharing can include car-pooling, which customers do not have the ownership of cars. Here we suggest three kinds of car sharing service to meet the different needs of different people:

Table 5: Three kinds of car sharing service and its features

<i>Types of car sharing</i>	<i>Operate by</i>	<i>Features</i>
Station-based car sharing	Normal car renting company	People can rent cars for hours
Peer-to-peer car sharing	Operated by global car sharing company or public agency	People who willing to share cars with other people
Car pooling company	Private company under government supervision	People who only want to share seats with other people

To sum it up, we create a ‘To do list’ for developing Chinese car sharing service. We present it in chronological order:

Table 6: A ‘To do list’ for developing Chinese car sharing service

Carry out variety ways of disseminations of car sharing service, including promotion from the government, TV advertisements, newspaper reports, Internet promotion, etc.

Develop and complete a trustful security system for car sharing service, especially developing car sharing insurance, rental contract and transportation regulations for car sharing users.

Build a Chinese characterized car sharing service. Try out three kinds of car sharing forms: Station-based car sharing, Peer-to-peer car sharing or Car pooling service.

Because we mentioned ‘government support’ several times, here we also elaborated some guidelines for the transportation department or the local government:

Task 1: Develop tailored transportation laws and regulations for car sharing service, especially tailored insurance for car sharing users.

This action can eliminate the concerns of people when involved in car sharing service. This is the very first step. With more people joining in car sharing, more problems may occur. Complete and perfect relevant laws and regulation is the key to develop a successful car sharing service.

Task 2: Issue specific license for car sharing cars

This action can help distinguishing between ‘illegal cars’ and car sharing cars. In China, if you use private cars to make money (like taxi) then this

action could be defined as illegal operation. Because this action cannot provide customers legitimate interest, so private cars is strictly forbidden from making profit from customers. That's another reason hinders the development of profit car pooling organizations. Hence, issue specific license for car sharing cars can help distinguishing from 'illegal cars' and maintain a health operation for car sharing service. Also this can be a way to manage and implement car inspection so that people can keep car sharing cars always in good condition.

Task 3: Plan special parking areas or parking spots for car sharing cars



Figure 6: Special parking areas for car sharing cars

Car-share parking areas can not only provide car-sharing more convenient but also make people realize that car-sharing is supported. It's also a great way to promote car sharing service. Users can automatically recognize that they have car sharing service in their city.

Task 4: Tax reduction, subsidies for car sharing service

The Chinese government currently uses subsidies mainly to support the

development of electric vehicles. We think this can be applicable to the promotion of Chinese car sharing.

8. Conclusion

Unlike the situation in North America and Europe, the concept of car-sharing has not yet reached great popularity in China. To find out the reasons behind this phenomenon, it is crucial to study the evolution of this concept and the unique challenges faced in the Chinese society. We set out our investigation on the Chinese car-sharing market with the two research questions:

- 1. Which elements influence Chinese car sharing market the most?*
- 2. How can car sharing in the Chinese market be supported?*

To the first question:

There are two main factors that hinder the development of car sharing in Chinese market. They are:

1. Car sharing service lacks a big dissemination and variety ways of advertisement.
2. The support from government is not enough

For the first factor, according to our survey result, there are only 14.42% of respondents have heard of car sharing which we think it's a big problem. This means car sharing service lacks a big dissemination. But the good

thing is: the respondents have a positive attitude towards car sharing and it is possible to increase the awareness of car sharing by good introduction or dissemination.

For the second factor, car sharing is still at the conceptual stage in China. People are worried about safety issues when involved in car sharing. A trustful framework of security system needs to be developed urgently for car sharing service. Regional and national governments need to be involved strongly.

To the second question:

In the short term, we recommend developing three kinds of car sharing service: station-based car sharing, peer-to-peer car sharing and car pooling service to meet different market demands. In the future, we recommend some points that can be added to develop a suitable car sharing for both customers and the city environment.

- Small-size vehicle for city usage, clean powertrain (E-vehicle)
- Safe enough for city usage, max. speed <100 km/h
- Customer can pick up and drop off at different locations within a pre-designated area

Then because we've find out that the support from government is not enough so we mainly focus on 'government support'. After we have a detailed discussion, here we summarize and create a 'to do' list as guidelines to the transportation department or the local government.

Table 7: A 'to do' list as guidelines to the transportation department or the local government

<p>Carry out variety ways of disseminations of car sharing service, including promotion from the government, TV advertisements, newspaper reports, Internet promotion, etc.</p>
<p>Develop and complete a trustful security system for car sharing service, especially developing car sharing insurance, rental contract and transportation regulations for car sharing users.</p>
<p>Build a Chinese characterized car sharing service. Try out three kinds of car sharing forms: Station-based car sharing, Peer-to-peer car sharing or Car pooling service.</p>
<p>Issue specific license for car sharing cars to inspect car sharing operations.</p>
<p>Plan special parking areas or parking spots for car sharing cars to show that car sharing is supported.</p>

9. Limitations

In this section, we discuss the constraints of our chosen methodology that may have influenced the interpretation of the findings. It is intended that through this critical review, we can recommend possible follow-up work for the further research:

Firstly, we mainly chose interview and survey as our research methods because we believed that the interview could help us to answer some specific questions and the survey can provide us general data about car sharing situation in China. However, the accuracy of the result from the survey is limited in that a rather narrow age group (i.e. 19-30) was selected as the sampling population. The results of our survey cannot represent the whole car-sharing situation in China. It would be interesting to conduct survey on older people who already own private cars, and see whether they have any interest in using the car-sharing service. .

Secondly, we found that car sharing has not been well publicized so finally we only got 12 car sharing users in the end. We could not come to a reliable conclusion based on responses of only 12 people. It would be better if we can do a workshop with them. Perhaps, follow up with some in-depth interviews with those respondents by asking their feedback on the framework of car-sharing we have proposed for China in the thesis..

10. Future Work

As we reflected several challenges we are facing in chapter limitation also as this is some of the first research done in this field in China, there is much yet can be explored and learned. A few works that we find interesting are these:

1. Conduct a workshop for car sharing users

Users' feedbacks are really useful to car sharing service development especially when the development is at an early stage. In our survey, we found that car sharing has not been well publicized so finally we only got 12 car sharing users. We fail to write a very reliable analysis about users' feedback because we could not use the questionnaire method to come to some conclusion by relying on only 12 people. It would have been perfect if we could do a workshop with them. Perhaps have interviews or ask some specific questions to these users then we could have gotten a lot of useful information to analyze car sharing users' experience. Therefore, a specific workshop for car sharing users could be the next step.

2. How to encourage more people to take part in car sharing service, including the efforts from customers, suppliers, car sharing company and other stakeholders?

Even though we gave some suggested guidelines to promote car sharing service. These suggested guidelines are mainly towards government. How to design a promotion model that can make people know car sharing, try car sharing, feel the benefits of car sharing then love car sharing could be

an interesting next step. This requires the knowledge about marketing and promotion.

3. How to develop a flexible business model for Chinese car sharing?

At present, many big cities such as Beijing and Shanghai are very suitable to develop car sharing service, but China is so big and different customers have different needs. Customers in Beijing may have different demands compared with customers in Shanghai. In our conclusion, we recommended that China can develop a diversity model for car sharing services. They are station-based car sharing, peer-to-peer car sharing, and car pooling service. How to maintain the diversity of car sharing service but still easy for the company to manage or government to inspect as well? This could be a challenge project.

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Appendix – A: Survey Results

Car sharing survey (汽车共享)

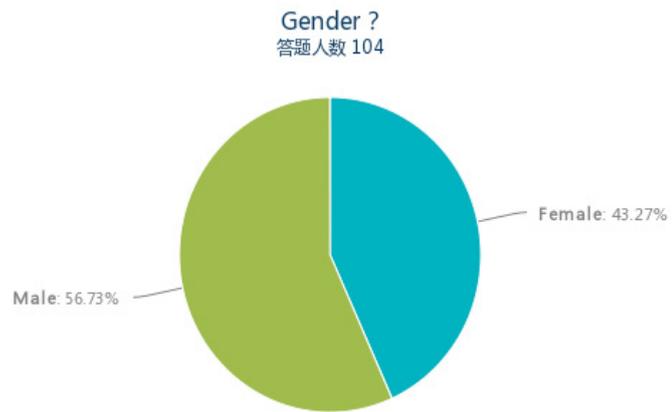
Introduction (简介)

In China, 'car sharing' actually refers to a more convenient way of renting a car. As long as people through the Internet or telephone, choose the models of the car you need and then you can pick up your car at any share points in the city where you live. You only need to pay for the time and the distance you drive. Car sharing is a model of car rental where people rent cars for short periods of time, often by the hour. They are attractive to customers who make only occasional use of a vehicle, as well as others who would like occasional access to a vehicle of a different type than they use day-to-day. 汽车共享简介：在中国，汽车共享有点类似于在租车行里的短时间包车。汽车共享手续简便，打个电话或通过网上就可以预约你所需要的车辆。你只需为你所行驶的里程及燃油支付相应的费用。汽车共享或者合伙拼是一种汽车租赁模式，用于人们短期内租车，往往按小时收费。他们吸引那些只是偶尔使用汽车的顾客，他们愿意偶尔享用不同类型的车，而不愿使用日常用车。

The survey is open to all people who live in Shanghai and it would take about 5 minutes to finish. 这项调查主要针对生活在上海的人们，调查大概需要花费你 5 分钟的时间

At the beginning, we want to have a basic knowledge about you, please truthfully answer them. We guarantee that all information is confidential. It's just for our thesis research, Thanks! 开始的几个基本问题能让我们对你个人有个简单的了解，请如实回答。我们保证所有的信息都是保密的，仅供我们做毕设参考所用，谢谢！

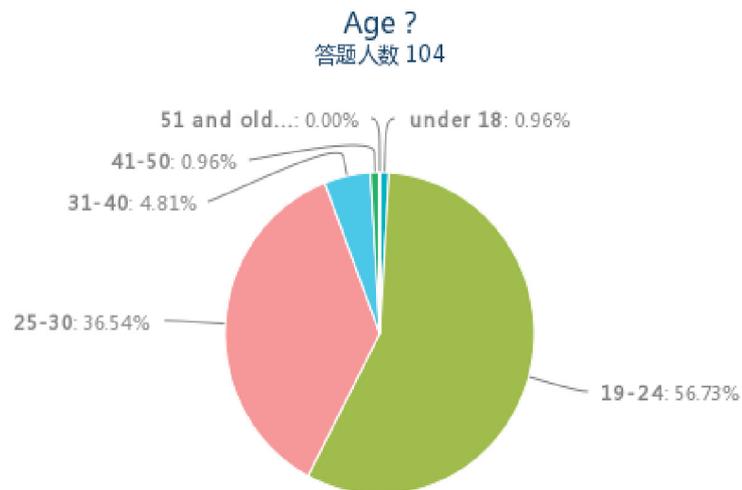
1、Gender?



Total 104 people

<input type="radio"/> Female	45
<input type="radio"/> Male	59

2、Age?

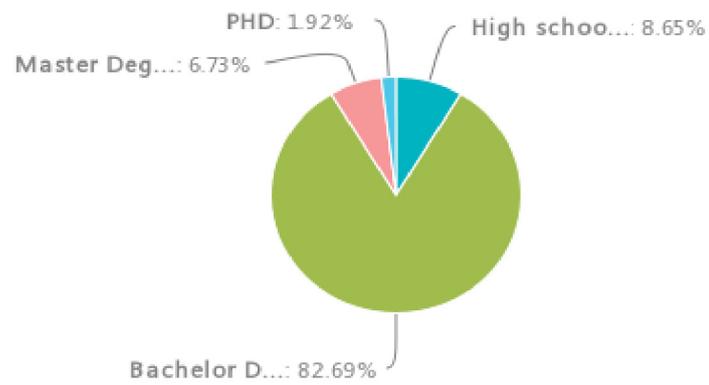


Total 104 people

<input type="radio"/> Under 18	1
<input type="radio"/> 19-24	59
<input type="radio"/> 25-30	38
<input type="radio"/> 31-40	5
<input type="radio"/> 41-50	1
<input type="radio"/> 51 and older	0

3、What is your highest level of education?

What is your highest level of education? 答题人数 104

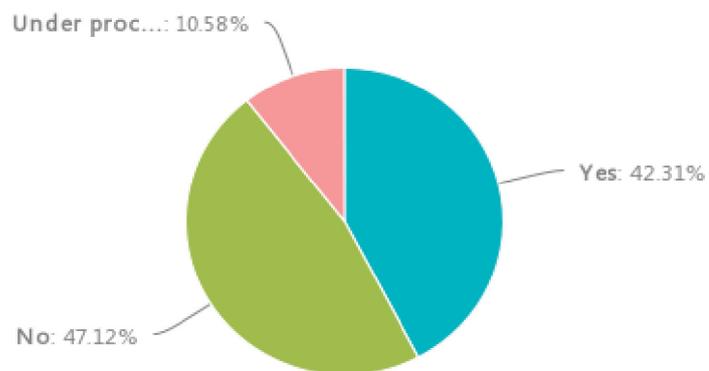


Total 104 people

<input type="radio"/> High School	9
<input type="radio"/> Bachelor Degree	86
<input type="radio"/> Master Degree	7
<input type="radio"/> PHD	2

4、 Do you have a driving license?

Do you have a driving license?
答题人数 104

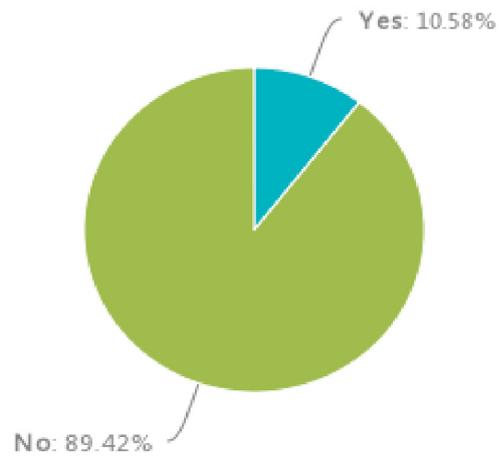


Total 104 people

<input type="radio"/> Yes	44
<input type="radio"/> No	49
<input type="radio"/> Under processing	11

5、 Do you have a private car?

Do you have a private car?
答题人数 104



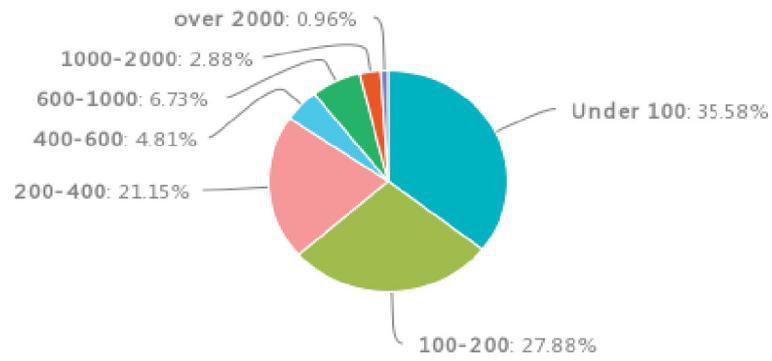
Total 104 people

<input type="radio"/> Yes	11
<input type="radio"/> No	93

6、 How much you spend on transportation? (CNY/month)

How much you spend on transportation?(CNY)

答题人数 104



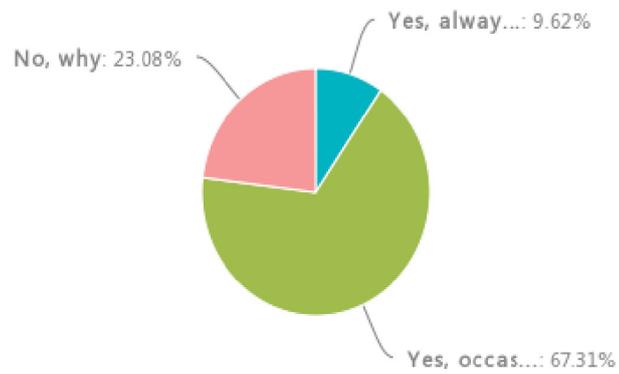
Total 104 people

<input type="radio"/> Under 100	27
<input type="radio"/> 100-200	29
<input type="radio"/> 200-400	22
<input type="radio"/> 400-600	5
<input type="radio"/> 600-1000	7
<input type="radio"/> 1000-2000	3
<input type="radio"/> Over 2000	1

7、 Do you usually use phone APPs to book some services (for example, booking hotel, taxi and so on)?

Do you usually use the phone APPs to book some services(for example, booking hotel, taxi and so on)?

答题人数 104



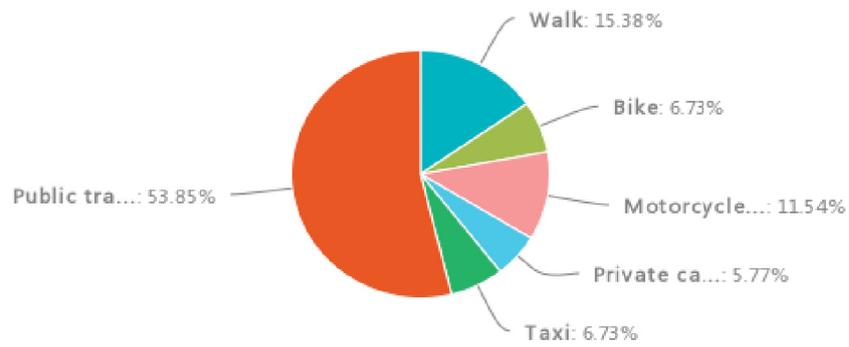
Total 104 people

<input type="radio"/> Yes always	10
<input type="radio"/> Yes occasionally	70
<input type="radio"/> No	24

8、What's the transportation tool that you usually take?

What's the transportation tool that you usually take ?

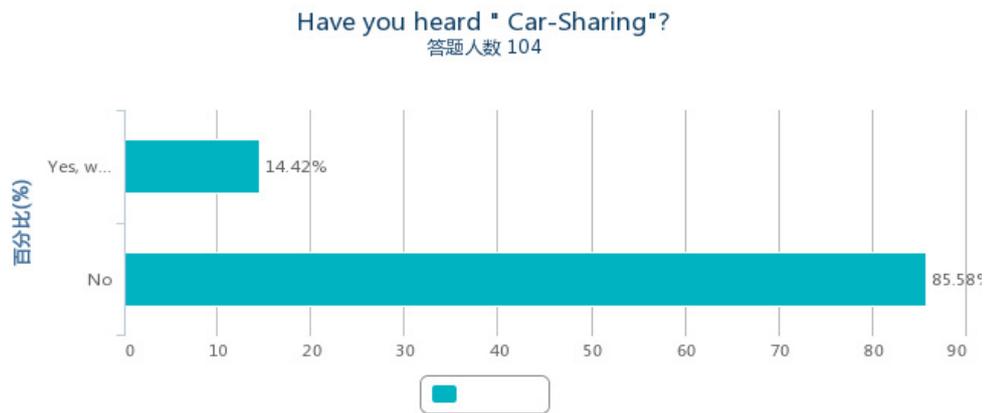
答题人数 104



Total 104 people

<input type="radio"/> Walk	16
<input type="radio"/> Bike	7
<input type="radio"/> Motorcycle or E-bike	12
<input type="radio"/> Private car	6
<input type="radio"/> Taxi	7
<input type="radio"/> Public transportation	56

9、Have you heard of 'Car sharing'?



Total 104 people

<input type="radio"/> Yes, which way _____	15
<input type="radio"/> No	89

Which way (15 people):

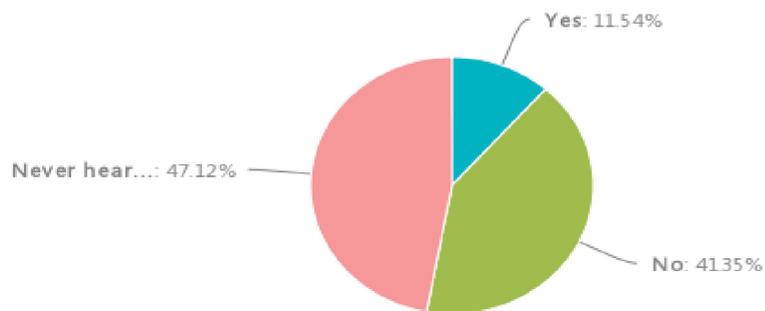
电视新闻	TV News	朋友	Friends introduced
网络	Through website	同事	Colleague recommended

同事	Colleague recommended	新闻报纸	Newspaper
电视新闻	TV News	网络新闻	News on the Internet
你们的问卷	From your survey	社交网站	Social website
网络	Through website	刚刚	Just right now (from your survey)
网络	Through website	听朋友说的	Heard from friends
网络	Through website		

10、 If you have heard of "Car sharing", have you used this new service?

If you have heard "Car-Sharing", Have you used this new service?

答题人数 104



Total 104 people

<input type="radio"/> Yes	12
<input type="radio"/> No	43
<input type="radio"/> I never heard of it, but I am quite interested in it after your short description. I would love to have a try if there is car sharing service in my area.	49

If you have used Car sharing service, please answer questions 11-15.

11、 Which platform you use to book a car?

Total 12 people

<input type="checkbox"/> Telephone	
<input type="checkbox"/> Internet	3
<input type="checkbox"/> Message	
<input type="checkbox"/> Directly book in the station	2
<input type="checkbox"/> Use specific Apps to book	7
<input type="checkbox"/> Other _____	

12、 Why you choose Car sharing service? (Short answer)

Total 12 people

答案	Answers (Translated)
便捷	convenience and fast
觉得使用方便	I think it's easy to use.
有机场接送服务, 感觉像回家一样	Some car sharing service provides airport pick-up services. Feeling like going home.

方便快捷	convenient and efficient
我想开不同的车，共享车辆选择性多。	Because I want to drive different cars. Car sharing has a lot of cars to make choose.
如果我只用很少时间，比起租车或买车它很省钱	I only make occasionally use of the vehicle. Comparing to owning a car or renting a car for full day, it can save my money.
有的时候我们有上班顺路的人，能载我一程	Sometimes we go the same way to work. Car sharing can give me a ride.
感觉很方便	It's really gave me a convenience experience.
喜欢呗	I like it.
实用以及好用	It's really work and easy to use.
只是想尝试新鲜事物	I just want to try new things.
手机预约，方便且便宜	Using phone Apps to book, It's easy and cheap.

13、 How many times you use Car sharing service per month?

Total 12 people

<input type="radio"/> Once	9
<input type="radio"/> 2-5	3
<input type="radio"/> 5-10	
<input type="radio"/> Over ten times	

14、 You usually use Car sharing service for?

Total 12 people

<input type="checkbox"/> Commuting to work	4
<input type="checkbox"/> Going shopping	4
<input type="checkbox"/> Business Trips	1
<input type="checkbox"/> Picking up kids	
<input type="checkbox"/> Travelling	3
<input type="checkbox"/> Hanging out with friends	
<input type="checkbox"/> Other _____	

15、 During using this service, what are the things that you do not like? (Short answer)

Total 12 people

暂时没有	Temporarily no problem	有时候车子不干净	Sometimes the car is not very clean
车太少	Too few cars to choose	交通拥堵	Traffic congestion
没	No	没有专用的停车场	Parking issues; we don't have specific parking zone.
没有	No problem	复杂的手续过程	Complex procedures
无法精确知道自己用了多少油	Hard to identify how much petrol that I used precisely.	付钱	Payment
无	Nothing	目前为止还挺好	So far so good

If you never use Car sharing service, Please answer the following questions! 16-18

16、 Please choose the reason why you never use Car sharing service!

Total 92 people

<input type="radio"/> I never know about it	51
<input type="radio"/> There is no Car sharing services in my area that I know of	25
<input type="radio"/> Considering the personal and property safety issues, I don't like to share stuffs with others	6
<input type="radio"/> I don't need this service	10

17、 If you would like to use Car sharing service, what are main reasons that you will consider?

Total 92 people

<input type="checkbox"/> Price	32
<input type="checkbox"/> Color of the car	
<input type="checkbox"/> Function of the car	22
<input type="checkbox"/> The quality of the service	38

18、What is your biggest expectation to Car sharing services? (Short answer)

74 respondents answered this question:

保证安全可靠	方便、快捷，实惠	安全，实惠	实惠	加大宣传和普及 价格合理
the price	更方便快捷	方便	价格低	你想要开的时候随时能开
价格实惠点，车型多一点，服务网点多一点	希望能及时解决我遇到的问题	能否普及	呵呵	性价比高
价格	希望能缓解一定程度的城市交通压力和改善城市环境	出行方便	更加安全和和谐，也更加便捷	便宜
创新，方便	更好的服务吧	方便、快捷	Good service with lower price.	可以实现
在中国各个地方定点设点，方便全国各地租车还车	没有	安全，服务周到，价廉	方便快捷	价格低
便宜	价格	刚刚	更加安全和和谐，也更加便捷	普惠大众
更多优惠	态度	方便、快捷。价格低！	Good service with lower price.	经济又方便
形式多元化，选择多样化	实会	无	方便快捷	节约费用
省钱	方便快捷、价格便宜	服务	方便快捷	还没有什么想法
前景	尽快实行	安全，性能	价格一般	多设置点
希望他的价格是我所期待的	随时随地	配车模	预约方便	便宜，方便，车子质量可靠
价格方面	节约 服务好	便宜有好货	可以更加普及	价格和便利
价格合理	随叫随到	没有	省	cheap

普及并保障安全	服务	便捷利落	服务好，价格 优惠	
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You have finished this survey, thanks for your support and help! If you have any questions, please contact us! Thanks again!